

Claims

- [c1] What is claimed is:
- 1.A method for scaling a digital picture, the method comprising following steps:
 - (a)inputting the digital picture;
 - (b)generating a block of the digital picture from the digital picture;
 - (c)creating two weighting matrices; and
 - (d)multiplying the block of the digital picture by the weighting matrices.
 - [c2] 2.The method of claim 1 wherein step (b) comprises filtering the digital picture with interpolation filters to generate the block of the digital picture.
 - [c3] 3.The method of claim 2 wherein the block of the digital picture generated in step (b) is stored in a block buffer.
 - [c4] 4.The method of claim 1 wherein step (a) comprises inputting the digital picture to a source buffer.
 - [c5] 5.The method of claim 1 wherein step (c) comprises creating each of the weighting matrices according to number of filter taps, sampling precision, and an adjusted scaling factor.

- [c6] 6.The method of claim 5 wherein the adjusted scaling factor is a value selected from a group consisting of a scaling factor, a predetermined value, a first weight factor, and a product of the scaling factor and a second weight factor.
- [c7] 7.The method of claim 1 wherein the method further comprises determining pixel indices and applying boundary conditions before performing step (d).
- [c8] 8.The method of claim 1 wherein step (d) comprises following steps:
(e)multiplying the block of the digital picture by one of the weighting matrices to generate intermediate data;
and
(f)multiplying the intermediate data by the other weighting matrix to generate output data.
- [c9] 9.The method of claim 8 wherein the method further comprises:
storing the intermediate data in an intermediate buffer;
and
storing the output data in an destination buffer.
- [c10] 10.The method of claim 9 wherein steps (e) and (f) are repeated if more output data need be generated from the block in step (e).

- [c11] 11. A scaling device for scaling a digital picture, the scaling device comprising:
- a source buffer for storing the digital picture;
 - a processing unit for creating two weighting matrices;
 - an intermediate buffer for storing intermediate data generated by multiplying a block of the digital picture by one of the weighting matrices; and
 - a destination buffer for storing output data generated by multiplying the intermediate data stored in the intermediate buffer by the other weighting matrix.
- [c12] 12. The scaling device in claim 11 wherein the processing unit comprises:
- a plurality of first multipliers for multiplying each data of the block with a coefficient;
 - a plurality of first adders each connected with a group of first multipliers for adding up numbers generated by the group of first multipliers;
 - a plurality of second multipliers each connected with a first adder for multiplying number generated by the first adder with a coefficient; and
 - a second adder connected with the second multipliers for adding up numbers generated by the plurality of second multipliers.
- [c13] 13. The scaling device in claim 11 wherein the scaling

device further comprises interpolation filters for filtering the digital picture so as to generate the block of the digital picture.

[c14] 14. The scaling device in claim 13 wherein the scaling device further comprises a block buffer connected with the interpolation filters for storing the block of the digital picture.